

May 23, 1939.

E. A. RINGGENBERG

2,159,179

PUMPING APPARATUS

Filed July 11, 1938

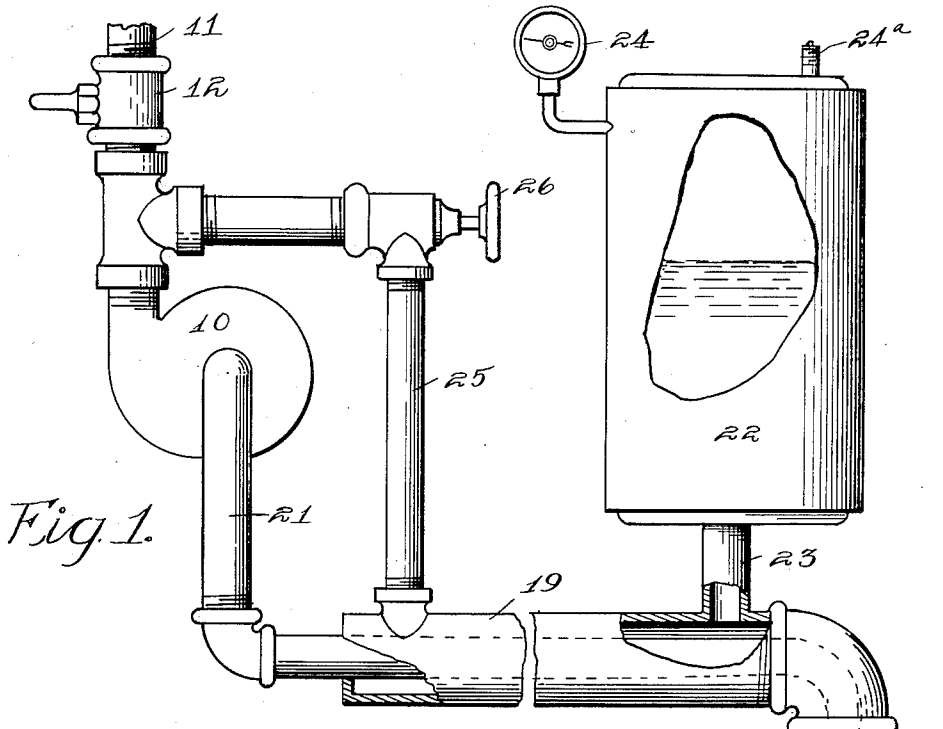


Fig. 1.

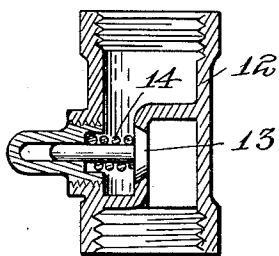


Fig. 2.

Fig. 3.

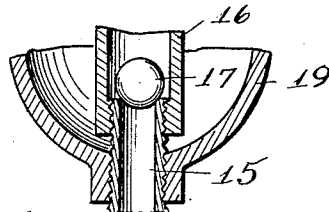
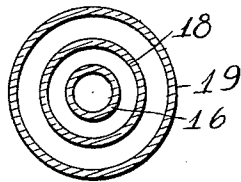
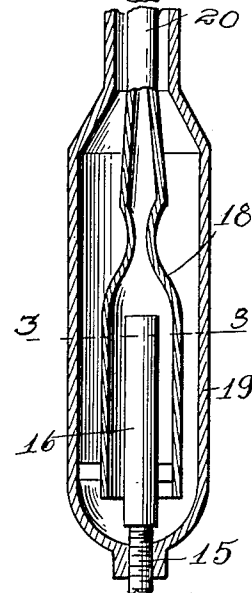


Fig. 4.



Inventor.
Edward A. Ringgenberg,
of Orwig & Haug, Attys.

UNITED STATES PATENT OFFICE

2,159,179

PUMPING APPARATUS

Edward A. Ringgenberg, Lytton, Iowa

Application July 11, 1938, Serial No. 218,520

2 Claims. (Cl. 103—5)

In the art of pumping water from relatively deep wells it is the present practice to locate the pump down in the well less than thirty feet above the water level of the well, or to locate the pump above the well and to provide means for priming the pump by filling the well tube with water from the pump to the normal water level of the well tube.

The object of my invention is to provide a pump apparatus of simple, durable and inexpensive construction in which the pump may be located above the well at some convenient place such as the basement of a house, where the pump apparatus is always accessible for purposes of repair, and to avoid the necessity of elevating it from the well for repair purposes, and to provide a pump apparatus in which the parts that are within the well are of such nature that they need substantially no servicing so that they need not be removed from the well.

A further object is to provide a pump apparatus of this class in which the well tube from the water level of the well to the pump is normally filled with water so that instantly upon the starting of the pump the flow of water from the discharge pipe of the pump will commence, but in the event that through leakage, evaporation or otherwise the upper end portion of the well tube should be empty, then with my pump apparatus and when the pump is operated, water under pressure from a pressure tank will actuate an injector and rapidly fill the well tube to the pump and start a normal flow of water from the pump, and thereafter this normal flow of water from the pump will refill the pressure tank and restore the desired pressure therein ready for a subsequent operation.

In the accompanying drawing:

Figure 1 shows a side elevation with parts broken away to show structural details and illustrating my complete pump apparatus;

Figure 2 shows an enlarged vertical sectional view of the spring-actuated one-way valve in the pump discharge pipe;

Figure 3 shows a transverse sectional view on the line 3—3 of Figure 1; and

Figure 4 shows an enlarged detail sectional view illustrating the upper end of the well tube, the adjustable extension thereon, the ball valve, and the lower end of the injector jacket.

The pump is indicated generally by the reference numeral 10 and is of the ordinary construction, preferably of the rotary pump type. Leading from the pump is the pump discharge pipe 11, and in this pipe is a valve fitting 12 having a one-

way valve 13 therein and a spring 14 for exerting a yielding pressure tending to hold the valve closed against pressure from the pump until the pump pressure reaches such an amount as to overcome the spring pressure.

The well tube is indicated by the numeral 15, and its upper end is screw-threaded, and the well tube extension 16 is screwed to its upper end. Within this extension 16 is a ball valve 17 resting upon the upper end of the well tube and serving to prevent the flow of water downwardly at that point.

Surrounding the upper end of the extension 16 is an injector nozzle 18 of ordinary construction. These parts are so arranged that when the extension 16 is moved upwardly in the nozzle the passageway through the nozzle is correspondingly restricted, and when in operation greater pressure is applied to the injector for elevating water to a greater height.

In practice, when the device is used in relatively deep wells the extension 16 is raised above that shown in Figure 1, and when in relatively shallow wells, the extension 16 is adjusted downwardly to permit a greater flow of water.

Surrounding the injector 18 is an injector jacket 19 having the upper end of the well tube 15 screwed into its lower end.

Communicating with the top of the nozzle 18 is a water-conducting pipe 20 leading to the pump intake pipe 21 and extended through the injector jacket. The water pressure tank 22 communicates with the injector jacket through the pipe 23; it is closed at its upper end and is provided with a pressure gauge 24 and a valve 24a through which air and water may be supplied.

Communicating with the injector jacket 19 is a by-pass pipe 25 connected to the water discharge pipe 11 above the pump. In this by-pass pipe is a manually controllable shut-off valve 26.

In practical operation, and when installing my improved pump apparatus, the pump and all of the working parts of the apparatus which may need servicing, attention and repair are preferably located in a residence basement or the like where they are readily accessible and protected from the weather. The only part of the apparatus which goes down into a well is the well tube and the injector and the lower part of the injector jacket, and obviously this can readily and easily be lowered into a well as a unit and then connected at the top of the well to the part of the injector jacket which is adjacent the pump apparatus. The only working part of the apparatus which is

down in the well and not readily accessible is the ball valve 17, and it is well known that these valves operate for long periods of time without adjustment or repair.

- 5 Assuming that the pressure tank 22 is partially filled with water and this water is under the desired amount of pressure, then when it is desired to start the apparatus the operator first starts the pump and then opens the valve 26.
- 10 When this has been done the flow of water from the pressure tank is commenced, and this flows downwardly through the injector jacket and up through the injector nozzle, and on the well-known principle of an injector the flow of water
- 15 is started from the injector nozzle up through the well tube and into the pump. This flow of water through the injector nozzle 18 draws water upwardly through the well tube 16. When the pressure of water from the pump and within the pump
- 20 discharge pipe reaches a pre-determined amount, then the valve 13 is automatically opened against its spring pressure, but before this valve 13 is opened the water pressure from the pump discharge pipe will pass through the by-pass pipe
- 25 25 and into the pressure tank and restore the desired amount of pressure therein. During the operation of the pump the valve 26 remains open and water flows down through the pipe 25 and operates the injector. It sometimes happens that
- 30 through leakage, evaporation or otherwise the upper portion of the pipe leading from the injector to the pump is empty, but when this occurs, the supply within the tank 22 is always sufficient to fill the pump supply pipe when the pump is
- 35 operated and the injector is working.

I claim as my invention:

1. A pump apparatus for deep wells, comprising a pump, a discharge pipe leading from the pump, a supply pipe leading to the pump, a well tube, a one way valve at the upper end of the well tube 5 to prevent downward flow of water therein, an injector nozzle surrounding the upper end of the well tube, a pipe leading from the upper end of the injector nozzle to the pump supply pipe, an injector jacket surrounding the injector nozzle, a 10 pressure tank connecting with the injector jacket, a by-pass pipe communicating between the injector jacket and the pump discharge pipe, and a one-way valve between the by-pass pipe and the pump discharge pipe.
- 15 2. A pump apparatus for deep wells, comprising a pump, a discharge pipe leading from the pump, a supply pipe leading to the pump, a well tube, an adjustable extension at the top of the well tube, a ball valve within said adjustable extension 20 to prevent downward flow of water therein, an injector nozzle surrounding the upper end of the said adjustable extension, a pipe leading from the upper end of the injector nozzle to the pump supply pipe, an injector jacket surrounding 25 the injector nozzle and a portion of the said pipe leading from the upper end of the injector nozzle, a pressure tank communicating with said injector jacket, a by-pass pipe leading to the injector jacket from the pump discharge pipe, a 30 one-way spring-actuated relief valve between the said by-pass pipe and the pump discharge pipe, and a manually controllable shut-off valve in said by-pass.

EDWARD A. RINGGENBERG. 35